ARM Assignment

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4UB17EC046

1) Explain the following

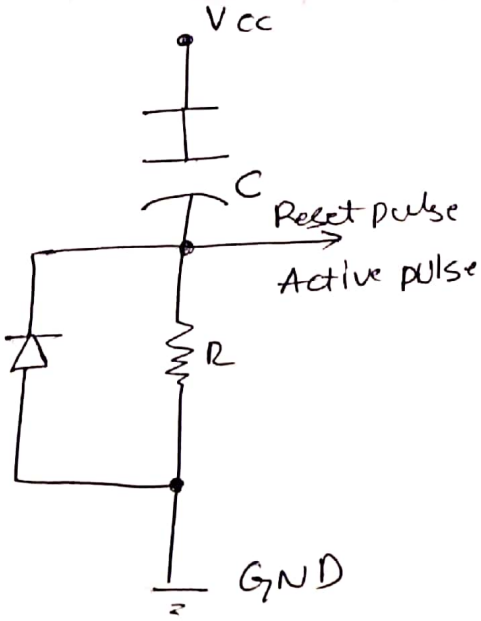
a) Reset circuit / power on reset

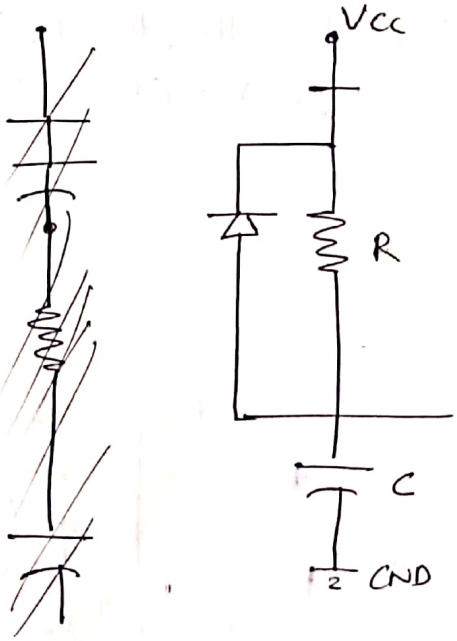
* The reset circuit is essential to ensure that the device isn't operating at a voltage level where the device isn't guaranted to operate, during system power ON

* The reset signal brings the internal registers and the different hardware systems of the firmware execution from the reset vector for conventional processors / controllers

* The reset vector can be relocated to an address for processor / controller supporting bootleader

* The reset signal can be either active high or active low





Reset Circuit types

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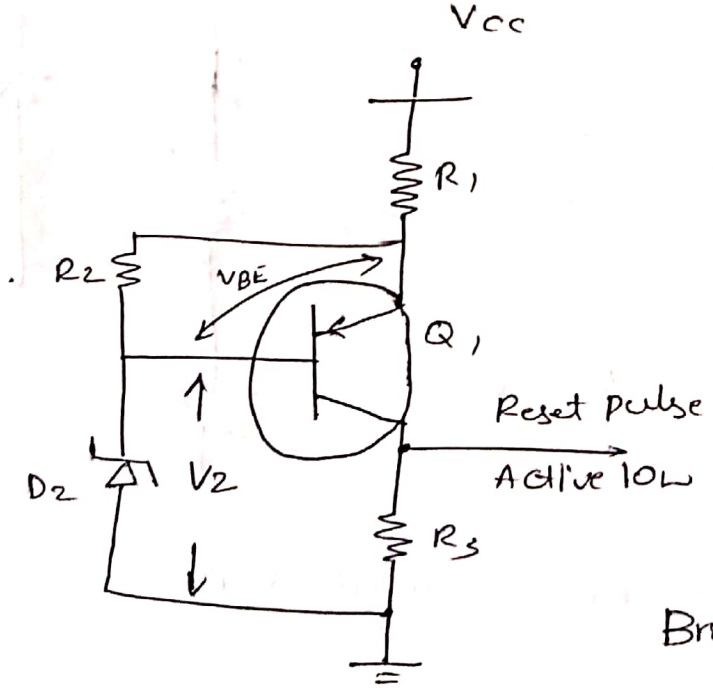
b) Brown-out protection circuit:

* Brown-out protection circuit prevents the processor / controller from unexpected program execution behavior when the supply voltage to the processors / controller falls below a specified voltage

* The processor behaviour may not be predictable if the supply voltage falls below the recommended operation voltage It may had to situations like data corruption

* A brown-out protection hold the processor / controller in reset state, when the operation voltage fals below the threshold, until it rises above the threshold voltage

* If processor / controller doesn't integrate a built-in brown-out protection circuit, the same can be implemented using external passive circuit or supervisior ICs.,



Brown-out circuit

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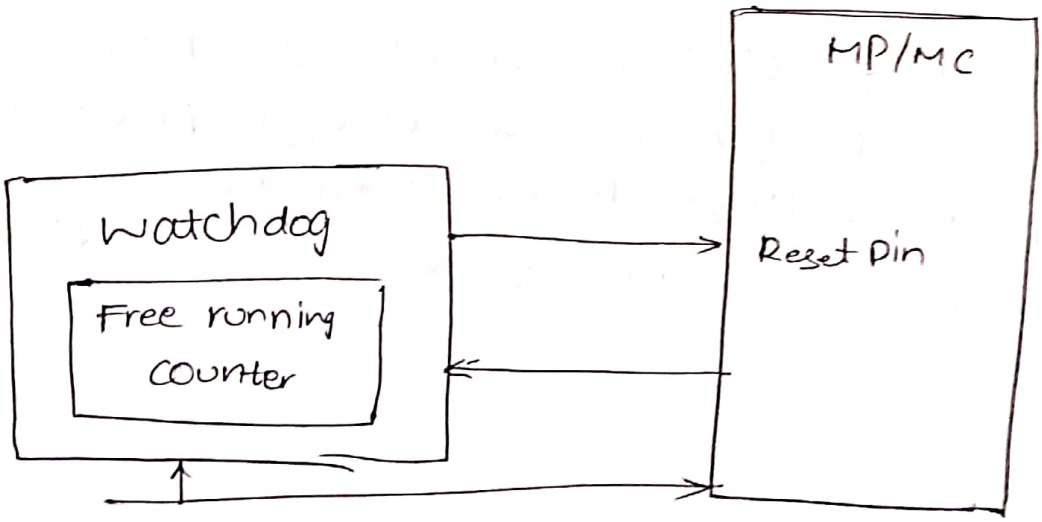
c) Watchdog timer:

* It is a hardware timer for monitoring firmware execution
* Watchdog timer is mainly used to come out of a situation, when the firmware being executed don't complete the execution due to malfunctioning
* Generally watchdog timer has a free running up/down counter, to which the firmware writes a '0' to upcounter or specific value to a downcount The watchdog counter then starts counting
* If the firmware execution completes before counter expires then the watchdog timer resets the value.
* If firmware execution doesn't complete due to malfunctioning the watch dog timer expires



Watch dog timer

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d) Piezo buzzer:

* It is an electronic device used to produce sound
* Piezo buzzer is based on inverse principle of piezo electricity
* Piezo electricity is the phenomenon of generating electricity when mechanical pressure is applied to it. Vice versa of this phenomenon is also true

* Whenever piezoelectric materials are subjected to an AC field they stretch or compress in accordance with frequency of signal there by producing sound.

There are two types

a i) Self driving
ii) External driving

* Self driving circuit contains all necessary components to generate sound at a predefined tone on applying voltage. Where external driving piezobuzzers supports generating of different tones

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e) Push Button Switch

* It is an input device and there are two types of configuration

i) Push to make

ii) Push to break

i) Push to make configuration:

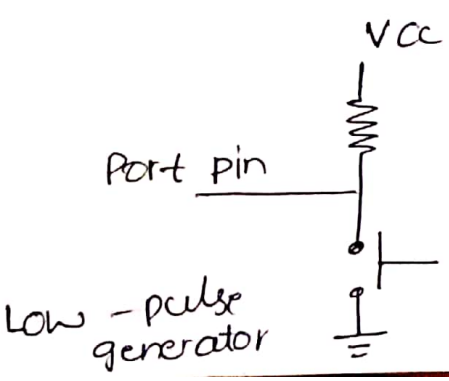
* The switch is normally in the open state and it makes a circuit contact when it is pushed or pressed

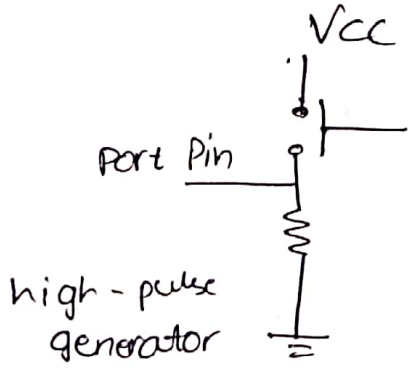
ii) Push to break configuration:

* Switch is normally in closed state and it breaks the circuit contact when it is pushed or pressed

* The push button 'stays' in the 'closed' (for push to make type) or 'open' (push to break type) state as long as it is kept in the pushed state and it brakes / makes the circuit connection when it is released

* It is connected to port pin of processor/ controller depending on the way push-button is interfaced to controller it can generate either a 'high' or low pulse.





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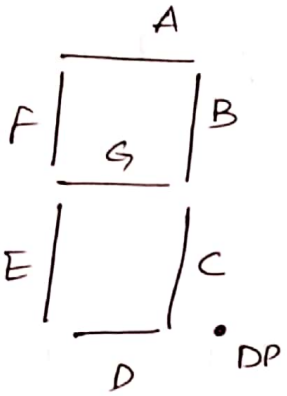
f) 7 segment LED display:

* It is an output device for displaying alpha numeric characters
* It contains 8 LED segments arranged in a special form
* Out of 8 segment, 7 are used for displaying alpha numerial characters and 1 segment for decimal point
* The LED segments are name A to G and the decimal point as DP



* All the 8 LED segment need to connected to one part of processor / controller for displaying alpha numeric digits
* The 7-segment LED display are available in 2 configuration
  i) Common Anode
  ii) Common Cathode

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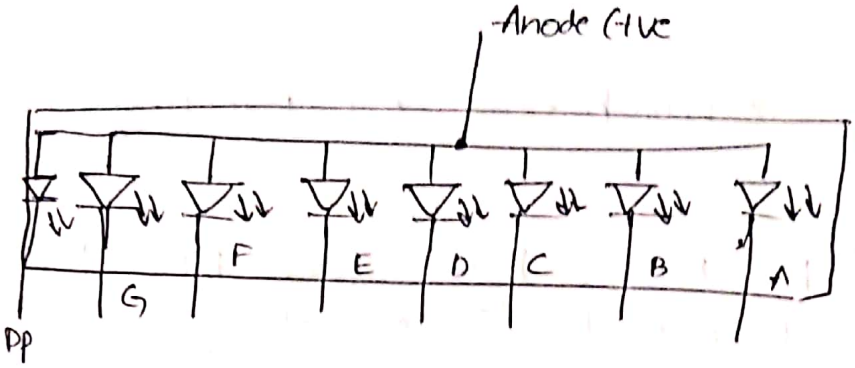
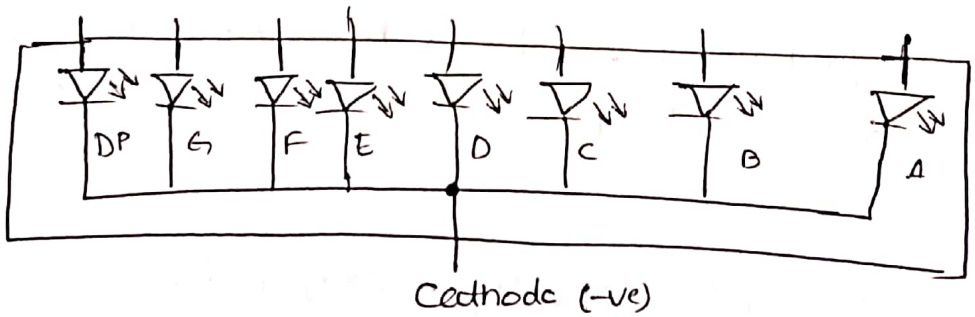
* Common - Anode configuration:



* The common anode of the 8 segments are tied together. The cathods are connected to port of the processor / controller in the order 'A' segment to the least significant port pin and 'DP' to most significant port pin.

* The current flow through each of the LED segment should be limited to max value supported by LED display unit. The typical value for the current is in the range 20mA

* Common cathode configuration:



* The anode of each LED segment is connected to port pins of the port to which display is interfaced

* The cathod's are joined to logic '0' are grounded, the individual segments are illuminated by application of the high or logic 1 signal via a

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current limiting resistor to forward bias the individual anode terminal.

2) What are drawbacks of writing code in ALP

Soln:

* The developer must have good knowledge of instruction set which is very tough to learn
* Program becomes developer dependent
* A program using Assembly language technique writes the program according to his/her view and taste
* It is very difficult for a second person to understand the code written in Assembly.

3) What are advantages of writing code in high level language.

Soln:

* It is easy to write the code
* Codes are portable, which means the same can be run on different processor without changing the program
* Programs aren't developer dependent
* Easy to debug
* Reduces overall system development.

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